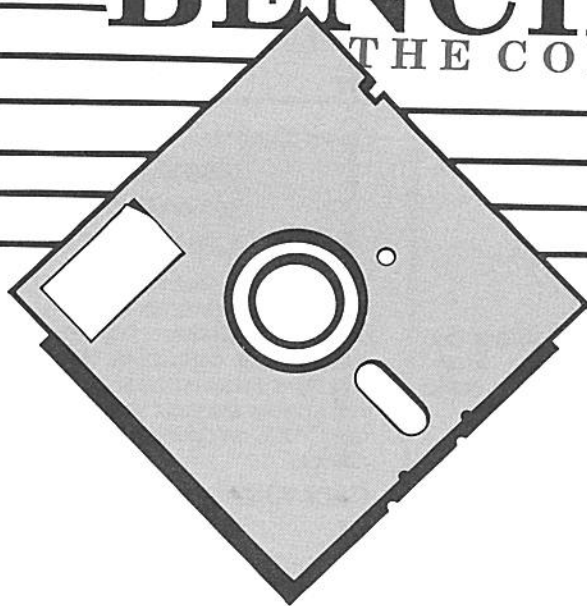


BENCHMARKS

THE COMPUTING CENTER



NORTH TEXAS STATE UNIVERSITY
The University of North Texas
VOLUME 9 NUMBER 2
MARCH/APRIL/MAY 1988

IN THIS ISSUE ...

GENERAL INFORMATION

	PAGE
New Bulletin Board Service Available Over the LAN	1
Proposition 2 Considerations for FY89	2
PHOENIX Upgraded	2
PCWS 1.2 is Now Available	2
New Utility on MUSIC	3
Super Computer User's Group Forming	4
New Consultant Hired	4
It's Userid Request Time Again!	4
Aman Presents Papers	4
ICPSR Summer Program in Quantitative Methods	4
National Conference on Educational Computing Hosted by NTSU Department	5
Departmental Swap & Sell	5
BENCHMARKS Forum	5

MICROCOMPUTERS

Version 2.0 of SPSS PC+ is Here	6
Multiple Range Tests for Complex Designs Using ONEWAY	6
Choosing a Desktop Publishing System	8
Micro-Tips	11

VAX COMPUTER CLUSTER

VAX File Protections	13
CPU Upgrade	13
VAXcluster Usage Statistics	14
VAX Notes	14

ADMINISTRATIVE INFORMATION SYSTEMS

PROJECT EAGLE: The NTSU and GTE Voice Response Project	16
Wanted: Telex Terminals	16
Production Services Group Formed	16
Transitions	17
Vacant Positions	17

COMPUTER SERVICES

Mainframe Performance Statistics	18
Disk Backup Schedules	20
ACADemic (NAS) Program Hit Parade	21



SERVICES AVAILABLE TO USERS OF THE NTSU COMPUTING FACILITIES

The NTSU Computing Center is located in the Information Sciences Building (ISB), Room 119. Phone Numbers:

Computing Center: (817) 565-2324
 Help Desk: (817) 565-4050
 Graphics Lab: (817) 565-3479
 ISB I/O Area: (817) 565-3890
 BA I/O Area: (817) 565-2350

All personnel listed below can be contacted either by calling the Computing Center or by sending them electronic mail on MUSIC/SP (ID-codes follow each name. All IDs are on BITNET node NTSUMUSIC).

BENCHMARKS - Claudia Lynch (AS04)

Information & ID-Codes; Disk Space Problems - Carolyn Goodman (AA03)

Statistical/Research Support - George Morrow (AS01), Scott Barber (AC10), Claudia Lynch (AS04), Jim Aman (AC29)

Academic ADABAS/COM-LETE - Sean Widmer (AC38)

CRSP & COMPUSTAT Problems - George Morrow (AS01)

Student Programming Problems - CSCI Dept., GAB Room 542A; BCIS Dept., BA Room 152

Problems with JCL, Passwords, or Operating Systems; or Communication/Terminal Problems - Help Desk

Data Entry; Test Scoring & Analysis - Betty Grise

Administrative Applications - Coy Hoggard

Printout Retrieval - ISB or BA I/O Operators

DIALING UP NTSU COMPUTERS OVER THE TELEPHONE

Phone numbers for the Local Area Network (LAN) are:

300/1200 BAUD: (817) 565-3300; 3499
 300 BAUD: D/FW METRO 429-6006
 1200 BAUD: D/FW METRO 429-9314

The numbers that will accept either 300 or 1200 baud communications have an autobaud feature that requires you to hit the <RETURN> key repeatedly so that the receiving modem can determine the appropriate baud rate. When you have established a communications link, the # prompt will appear on your screen and you can enter one of following CALL commands to connect with the computer of your choice.

CALL 8040 connects with the NAS/8083 (supports line editing or PCWS). Operating environments available are: MUSIC/SP, VM/CMS.

CALL 3270 connects with the NAS/8083 through a 3270 protocol converter (supports full-screen editing). Operating environments available are: MUSIC/SP, VM/CMS, ADABAS/COM-LETE, PHOENIX

CALL DEC connects with the VAXcluster (VMS, Eunice)

CALL 780 connects with the Research VAX (Unix)

CALL 3000 connects with the Libraries' HP-3000 (Bibliographic data base).

CALL 6800 connects with the NBI (Unix)

HOURS FOR NTSU COMPUTER ACCESS AREAS : SPRING 1988*

Location	Times	Days
Computing Center RJE	Noon-Midnight 7 a.m.-Midnight 7 a.m., Tuesday-Midnight, Saturday (Open 24 hours/day)	Sunday Monday Tuesday-Saturday
ISB 110 Terminal Area	2-10 p.m. 7:30 a.m.-Midnight 7:30 a.m.-6 p.m. 9 a.m.-6 p.m.	Sunday Monday-Thursday Friday Saturday
College of Business	Noon-11:45 p.m. 8:15 a.m.-11:45 p.m. 8:15 a.m.-7:45 p.m.	Saturday, Sunday Monday-Thursday Friday
GAB 550C	2 p.m.-Midnight 8 a.m.-Midnight 8 a.m.-5 p.m. 2-8 p.m.	Sunday Monday-Thursday Friday Saturday
Graphics Lab	Noon-10 p.m. 8 a.m.-11 p.m. 8 a.m.-8 p.m. Noon-5 p.m.	Sunday Monday-Thursday Friday Saturday

*Hours may vary. Check MUSIC/VAX News and/or posted schedules for exceptions.

Unless otherwise noted, articles or information in BENCHMARKS may be reproduced for nonprofit purposes provided the publication and issue are fully acknowledged.

GENERAL INFORMATION

New Bulletin Board Service Available Over the LAN

By Scott Barber (AC10@NTSUVAX)
and Billy Barron (BILLY@NTSUVAX)

There is a new bulletin board service (BBS) available over the Local Area Network. It is called the University of North Texas BBS and it has the potential to provide valuable benefits to a wide range of people. The UNT BBS is capable of supporting such services as electronic mail, public message posting, discussions on an infinite range of topics (computer- or non computer-related), and file uploading and downloading. Although it runs on the VAXcluster, you do not need an account on the VAX to use the BBS.

The creation of this BBS fulfills a longterm wish by the Academic Computing Services staff for a BBS service for the campus community. In considering the appropriate hardware and software for this BBS, it was determined that simultaneous access by multiple users would be important enough to rule out a microcomputer-based system. With this thought in mind, we began looking for BBS software to run on the VAXcluster.

Looking for BBS software proved very frustrating. It was difficult to find software that supported many of the features that we wanted, such as support for the Kermit file transfer protocol. This capability is essential for providing binary file transfer (e.g. MS-DOS .COM, .EXE, and .ARC files) over the LAN.

After a long and unproductive search, it was decided that we would

write our own BBS software. With typical enthusiasm, James Shoffit, Billy Barron, Lucia Young and Dwayne Springfield (all of whom were VAX operators at the time) took on the task. They wrote the BBS in Pascal, and learned a lot about VMS file locking along the way!

The features of the BBS they created include:

- User-to-user Mail
- Conferences
- ASCII and Kermit protocol file transfers
- Bulletins
- Questionnaires
- Full Screen Editing
- Several Utilities

After a few months of testing, the BBS is now available for public use. While this board may not support some of the features that users of the latest microcomputer BBS' are used to, we hope that it will provide the basic functions of public (and private) discussion, postings of items of public interest, and the reliable and efficient exchange of good public domain and shareware software.

If you plan to use a microcomputer for signing on to the BBS, you should set up your communications software parameters to the following values. (Phone numbers for calling the LAN are on page i of this *Benchmarks*.)

WORD LENGTH (Also known as DATA BITS or CHARACTER BITS) - 8

STOP BITS - 1

PARITY - NONE (if not possible, use WORD LENGTH = 7 with EVEN parity, but you will be unable to use Kermit)

DUPLEX - FULL

FLOW CONTROL -

XON/XOFF (Also known as the handshake character. If your communications software requests a decimal value for handshaking, use 17).

There are two different ways to sign on to the BBS, as illustrated below. The text that you are supposed to type is shown in bold face. If you have any trouble using the BBS, please call the Help Desk (565-4050) for assistance.

1. From the LAN:

#ECHO OFF

#CALL DEC

VAX/VMS Cluster (2 VAX-11/785 CPUs)
-NTVAXB-

North Texas State University, Denton, TX

Username: **BBS**

Welcome to the University of North Texas
BBS

Please log in. Use your REAL first
and last names.

Enter your first name:

2. From your VAX account:

\$ BBS

VAX/VMS Cluster (2 VAX-11/785 CPUs)
-NTVAXB-

North Texas State University, Denton, TX

Username: **BBS**

Welcome to the University of North Texas
BBS

Please log in. Use your REAL first
and last names.

Enter your first name::

Proposition 2 Considerations for FY89

By Stanley Sawyer, Planning and Budgeting Assistant to the Associate Vice President for Computing at NTSU and TCOM

In preparation and review for the FY89 Computing Center budget, two changes have occurred that could affect departmental FY89 Proposition 2 or operating budgets. These changes are discussed below.

First, the Computing Center has been funded for and will provide a central maintenance contract for all Sytek communications equipment, Telex terminals, and associated communications control units. Therefore, departments should not need to budget for maintenance for these items. When purchasing new units, the purchase order should include the maximum allowable maintenance (usually two years), and the Computing Center should be notified, so the equipment can be included in subsequent maintenance contracts.

Second, the Computing Center will not renew the maintenance contract on Diablo printers in September, 1988. We feel that the Diablo printer technology has been effectively replaced by modern Epson type printers maintained by the Microcomputer Maintenance Shop and/or Laser printers now on State contract. Individual departments will need to make arrangements to obtain maintenance for Diablo printers, or replace them with new, more cost effective dot matrix or laser printers.

If you have any questions about the above changes, feel free to call the Computing Center (565-2324) for further information. ♦

PHOENIX Upgraded

The PHOENIX Computer Based Training system has been upgraded to Release 6.1A. ♦

PCWS 1.2 Is Now Available

By Philip Baczewski - MUSIC
Time-share Coordinator
(AC12@NTSMUSIC)

What is PCWS?

An upgraded version of Personal Computer Workstation (PCWS) is now available for use with MUSIC/SP at North Texas State University. PCWS is a microcomputer communications package licensed to NTSU by IBM and McGill University. PCWS provides full-screen terminal emulation and file transfer facilities especially tailored to the MUSIC/SP operating system. The new PCWS (version 1.2) has been enhanced to include a keystroke redefinition facility, VT102/VT52 terminal emulation, a reorganized and extended set-up facility, a new help facility, and other new features which are further detailed later in this article.

The minimum requirements for running PCWS are:

- An IBM Personal Computer, XT, Jr, Convertible, or AT model or compatible with at least 192K bytes of memory.
- A Monochrome, Color, or Enhanced Color Display capable of displaying 80 columns of text.
- PC-DOS or MS-DOS version 2.0 or greater.
- One 360K floppy disk drive or one 360K floppy disk drive and a hard disk.
- An asynchronous communications adapter or internal modem.

How Can I Get a Copy of PCWS 1.2?

To receive a copy of PCWS 1.2, bring a formatted 5 1/4 inch floppy diskette to the Computing Center Offices (ISB 119). Your diskette will be exchanged for one already containing the PCWS 1.2 files. You will also be

given a handout entitled "Introduction to Personal Computer Workstation (PCWS)."

Users who already have a copy of PCWS 1.1, may down-load the files for PCWS 1.2 by following the procedure outlined below.

NOTE: The PCWS 1.2 files occupy about 240K of disk space. Down-loading these files at 1200 baud will take at least one hour's time. On-Campus users with direct access to a 9600 baud SYTEK LAN modem can down-load these files in considerably less time (15 minutes or less). Down-loading to a floppy diskette will generally take more time than to a hard disk. Users with only 300 baud access should NOT down-load these files, but instead use the above procedure to obtain a copy from the Computing Center.

1. Users with a hard disk should create a new subdirectory to contain the PCWS 1.2 files. (for example: MKDIR PCWS12)

Users without a hard disk should format a new 5 1/4 inch floppy diskette.

2. Start PCWS and connect to MUSIC in your usual manner.
3. Users with a hard disk should make the new subdirectory the default directory. For example:

Press <ALT> <Q> (Return to DOS)

CD/PCWS12 (Make PCWS12 the Current Directory)

/PCWS/TERM (Execute the TERM program to return to PCWS)

Users without a hard disk should remove their PCWS diskette from the default drive and insert the newly formatted diskette.

4. From *Go mode in TERM, type XTPC PCWS.LIST to begin down-loading these files.

Once all files have been successfully down-loaded, you can run PCWS 1.2 from its new directory or diskette in

the same manner as previous versions (type CLM to load the Communications Line Monitor and then type TERM to start the terminal program).

How Can I Get More Information on PCWS 1.2?

In addition to the Computing Center handout, "Introduction to Personal Computer Workstation (PCWS)," a publication entitled "Personal Computer Workstation User's Guide" is available at the NTSU University Store for \$2.95. This guide documents all features of PCWS 1.2. Also, there is a file named README on the PCWS 1.2 diskette which provides basic information necessary to install and run PCWS. Once PCWS is running, an extensive help facility can be accessed by pressing ALT-H on your PC keyboard.

New Features of PCWS 1.2

Some of the new features of PCWS Version 1.20 are :

- Ability to redefine most keystrokes
- VT52/VT100 Terminal Emulation
- New Manual (SH21-0031)
- Personal Rexx Function Package
- Application Programming Interface
- DOS Device Driver
- IBM 3270 Entry Assist for 3270 Mode
- Enhanced File Transfer Facilities
- Re-Organized Setup Facility
- Enhanced EXEC Facility
- New HELP Facility

These new features are elaborated below.

Ability to Redefine Keys

PCWS now gives you the ability to redefine keystrokes in all terminal modes. Unlike most programs where one keystroke is substituted for another, here you can define the

keystrokes differently in each terminal mode. A new keystroke profile, "PC#WS.KEY", is used to save the keystrokes.

VT52/VT100 Terminal Emulation

PCWS now emulates the popular DEC VT52 terminal or DEC VT100 terminal with VT102 extensions.

New Manual

The PCWS documentation has been taken out of the *MUSIC/SP User's Guide* and put into a manual of its own, the *Personal Computer Workstation User's Guide* (SH21-0031, available at the University Store).

Personal Rexx Function Package

PCWS now offers a communications function package for the popular "Personal Rexx" language from Mansfield Software Group Inc.

Application Programming Interface

There is a general Application Programming Interface which allows users to write applications in any language they choose and use PCWS as the communication line manager. The interface allows a program to set/query any PCWS parameter, send data, receive data, wait for events, and more.

DOS Device Driver

Provided with PCWS 1.20 is a DOS character device driver which enables any program to talk to PCWS using standard DOS file handles. Standard output can be redirected to PCWS (in turn the host system), and standard input can be redirected from PCWS.

IBM 3270 Entry Assist

Users now have the ability to use IBM's Entry Assist functions when using PCWS in 3270 mode. This package adds functions like, Word Left, Word Right, Delete Word, Word Wrap, Margins, End of Line, and more. These features are

provided directly in PCWS without any support from the host system or control unit. Entry Assist values can be saved in a new profile which by default is called "PC#WS.ENT".

Enhanced File Transfer Facilities

The file transfer programs, XTPC and XTMUS, have been enhanced to fully support file names including path names. PC file names can now be up to a maximum length of 64 bytes. Wild card characters are now completely supported which means any number of "*" or "?" are allowed in the file specifications on both sides. A "-Comp" option has also been added to compress the data while sending a file. This reduces the transmission time for most files.

Re-Organized Setup Facility

The Setup Facility has been reorganized to logically group all functions on panels. Also many new options have been added to the facility.

Enhanced EXEC Facility

The EXEC facility has been enhanced to provide more functions and more commands. The error messages now provide better information as to the nature of the error. All messages are now numbered and can be checked in the PCWS User's Guide for more information.

Enhanced HELP Facility

The HELP facility has been completely changed. The new facility is completely driven from standard ASCII text files. It is a top-down menu system allowing the user to get help on most PCWS features. ♦

New Utility on MUSIC

A new utility is now available to help BITNET users on MUSIC find out node names and their corresponding institutions. Typing FINDNODE *string* will show you all nodes on BITNET whose node names or institution names contain *string*. For more information type HELP FINDNODE while logged on to MUSIC. ♦

Supercomputer User's Group Forming

By Dave Molta (MOLTA@NTSUVAX),
Manager of Academic Computing

The Computing Center is in the process of organizing an informal Supercomputer User's Group to explore current and future needs for high performance computing at NTSU. The impetus for the formation of this group is an agreement initiated by Dr. David Golden, Provost and Vice President for Academic Affairs, whereby the Houston Area Research Center (HARC) will provide NTSU with two hours of computing time on their NEC SX2 Supercomputer. Since this system is accessible by NTSU researchers via our existing interface to the Texas Higher Education Network (THEnet), we are interested in making this CPU time available to campus researchers. In order to take advantage of this opportunity, programs must be written in ANSI Standard Fortran. We are currently negotiating with HARC to provide a two-day training course on campus during the week of May 16.

The Supercomputer User's Group will hold its first meeting as an informal lunchtime session at a time and location to be announced. Topics to be addressed at the initial session include methods for allocating the SX2 CPU time and present and future needs for high performance computing at NTSU. If you are interested in participating, please contact me at 565-2324 or via electronic mail. Once a specific time and location have been established, those parties expressing interest will be contacted. In addition, notices will be placed on the VAX-VMS, Research VAX, and MUSIC computing systems. ♦

New Consultant Hired

Phanit Laosirirat has taken the part-time consulting position vacated by his fellow countryman, Panu Sittiwong. A former Help Desk employee, Phanit is ready to provide you with statistical/research help. ♦

Its Userid Request Time Again!

By Carolyn Goodman, Computing
Center Administrative Services

Summer I classes begin Monday, June 6, 1988. Faculty Members: It is not too early to think about classroom userid accounts for your Summer I classes; on the blue "F-020-01 NTSU Computing Center New USER-ID Request Form," please indicate if your class will be meeting both Summer I and II terms. A white Classroom ID Usage Projection form should be completed in addition to the blue request form. Come to the main Computing Center Office (Information Science Building, Room 119) should you require assistance in obtaining or completing these forms.

Jumping ahead a bit, it is also not too early to think about renewing your individual userid account, especially if you plan to be away from campus over the summer. Individual faculty and student userid accounts will be deactivated September 1, 1988. A pink "F-020-02 NTSU Computing Center USER-ID Change Form" should be completed early in order to insure access after September 1st. Do not delay or you could find yourself without access to your userid at a most inappropriate time. ♦

Aman Presents Papers

Jim Aman, a part-time Academic Computing Services employee, presented papers at two conferences this semester. In January, at the Southwest Educational Research Assn. conference, he and Dr. Alan Moore of Educational Foundations presented a paper entitled "Effect of Non-Simple-Structure Variables on the Reliability of Factor Scales." In February, he and Dr. Cathleen Norris, of Computer Education and Cognitive Systems, presented a paper at the Texas Computer Education Assn. conference entitled "A Linked List Family Tree." ♦

ICPSR Summer Program In Quantitative Methods

It's getting close to summer, and that means it's time to announce the ICPSR summer program. Each year the Inter-University Consortium for Political and Social Research (ICPSR) at the University of Michigan sponsors this program. Since NTSU is a member of the Consortium, graduate students and faculty members are eligible to attend the Summer Training Program. Graduate students can either take courses for credit or audit them. Faculty members will be considered Visiting Scholars.

The program is partitioned into two four-week sessions (June 27-July 22 & July 25-August 19), with instruction organized in lecture, seminar, and workshop formats. Additionally special workshops are offered that provide participants with an opportunity to examine the impact of various methodologies on specific substantive issues and that address the practical objectives of providing technical support for computing specialists and data librarians. The courses, taught by instructors from institutions across the U.S. and Canada, include:

- Basic Mathematics
- Mathematics for Social Scientists
- Logic of Data Analysis
- Implications of Sample Design for Data Analysis
- Introduction to Computing
- Introduction to Statistics and Data Analysis I
- Introduction to Regression Analysis
- Linear Models
- Multivariate Statistical Methods
- Scaling and Dimensional Analysis
- Latino Research Issues
- Quantitative Historical Analysis

For more information, contact Dr. Rick Cupitt in the Political Science Department, EXT. 2318. He is the official NTSU ICPSR Representative and has brochures, posters, admission forms, etc. ♦

National Conference on Educational Computing Hosted by NTSU Department

The Department of Computer Education and Cognitive Systems here at NTSU is hosting the 9th National Educational Computing Conference (NECC'88) at the Loews Anatole Hotel in Dallas on June 15-17, 1988. According to the "Advance Program" distributed for the event, the goals of NECC'88 are:

- To present a spectrum of major work regarding computers in instruction.
- To promote interaction among individuals at all levels who use various aspects of computing in education.
- To develop and coordinate the activities of the professional groups involved with computer uses in instruction.
- To produce a Proceedings documenting the status of educational computing.

For additional information on the conference or requests for registration information, please contact Dena Hilliard, departmental secretary for Computer Education and Cognitive Systems 817-565-3790.

Departmental Swap & Sell

FOR SALE

- DIABLO printer with Acoustical Coupler. Contact Janice Wilson in Management, Ext. 3140.
- XEROX Full Page Monitor for use with a desktop publishing system. Contact Sandy Benrens in Education, Ext. 2942.
- XEROX Full Page Monitor for use with a desktop publishing system. Contact Claudia Lynch in the Computing Center, Ext. 2324.

BENCHMARKS FORUM

BENCHMARKS FORUM is intended to serve as a vehicle for answering questions that may be of general interests to the user community. If you have a question, please send electronic mail to the *Benchmarks* editor (AS04@NTSUV1) or write it down and drop it by the Computing Center. Deadlines permitting, we will try to answer it in the next issue.

Question: How do I use random numbers in a program on the VAX?

Answer: You must use a system function named MTH\$RANDOM. It must be given a seed and then it returns a real number between 0 and 1. More information on it is available in the *RunTime Library Manual* (type **HELP MANUALS** while logged-on to the VAX to find a copy).

Since Pascal is the most used language on the VAX, an example program in Pascal follows:

```
PROGRAM Test(INPUT,OUTPUT);
VAR Seed      : INTEGER;
    RandomNumber : REAL;

FUNCTION MTH$RANDOM(VAR Seed :
    INTEGER):REAL;

EXTERN;

BEGIN
    Seed := 45;
    RandomNumber :=
    MTH$RANDOM(Seed)
    WRITELN(RandomNumber);
END.
```

Question: I am trying to edit a MUSIC file whose length is greater than 80 chars. How can I flip the screen to show the columns past 80? It used to be PF14, but that no longer works.

Answer: Under the MUSIC 1.1 editor, PF14 was set to WINDOW FLIP. To see the right-hand portion of a file, you can type WINDOW FLIP from the editor command line. You may set PF14 (or any other PF key for that matter) by using the define command. From the editor command line type:

```
DEFINE PF14 WINDOW FLIP
```

If this is a command you use frequently, you may want to create an EDITOR file so that this PF key can be set each time you edit a file. Create a file named EDITOR containing the following statements:

```
/INC *COM:EDITOR
DEFINE PF14 WINDOW FLIP
```

Of course, if you wish to always use the MUSIC 1.1 editor PF key definitions, you may follow the procedure outlined below:

In *GO mode type:

```
EDIT OLDEDIT
```

At the Editor command line type:

```
FILE EDITOR
```

You will now have a MUSIC save library file called EDITOR which contains definition statements for your editor PF keys.

Benchmarks Reader/User feedback is encouraged. Send all letters, suggestions, etc. to (AS04@NTSUV1) or:

North Texas State University
The Computing Center
NT Station, Box 13495
Denton, Texas 76203
Attn: Benchmarks Editor

MICROCOMPUTERS

Version 2.0 of SPSS PC+ Is Here

The latest version of SPSS PC+ has been shipped and is available for installation on university-owned PCs under a site license agreement between NTSU and SPSS, Inc. There is a new default interface with this version, which will be nice for new users, although potentially a little disconcerting for those used to the standard SPSS/PC: prompt.

When V2.0 is loaded, you are presented with a blank LOG screen on the lower half of the display, with a new menu system above this system allows you to "pull down" commands for execution. In addition, there is a glossary and help facilities incorporated into this renovated SPSS REVIEW editor. Files and variables can also be selected from menu-generated lists.

Other modifications include some improvements to REPORT, allowing an AUTOMATIC specification to generate a quick report using default settings; a MODIFY VARS command to let you rename, reorder, or drop variables from the active file; some parameters added to the SET command, to configure your default working environment or use more than 25 lines on supported monitors; and a support for the SPSS RELIABILITY command.

Another significant addition to this package is the inclusion of support for PC local area networks, so that we can run SPSS PC+ in some of the PC LANs presently installed on campus. For more information or to obtain a copy of this new version, contact Scott Barber in the Computing Center (ISB 119, 565-2324). ♦

Multiple Range Tests for Complex Designs Using SPSS-PC+ ONEWAY

By Scott Barber, Academic Computing Services Staff
(AC10@NTSUVAX)

In the course of an analysis to compare a dependent variable across groups, after determining that the groups are not all equal (the overall F test), one usually wants to see *which groups* are significantly different from the others. Unless you have only one group variable and are executing a one-way analysis of variance, there is no procedure in SPSS-X or SPSS-PC+ for directly obtaining such "multiple range tests."

Nevertheless, with the use of the matrix input option of SPSS-PC+ and the ONEWAY procedure, you can "fool" SPSS-PC+ into computing range tests for more complex designs, including those with multiple groups, interaction terms, and repeated measures. Essentially, you build a matrix with vectors of the cell means, the number of observations per cell, and the error mean square and degrees of freedom. Reading this matrix into the ONEWAY procedure and labeling the cells for ease of interpretation produces the range tests desired.

An example using data from the *SAS System for Linear Models* manual illustrates this technique.¹ In this experiment, three seed growth

promoting methods are applied to five varieties of seed. Six pots were planted for each combination of METHOD by VARIETY combination, resulting in 90 pots.

Standard factorial ANOVA reveals that there is a significant interaction between these two variables on the dry matter yields of these plants after four weeks. By requesting the cell means from the ANOVA (or MANOVA) procedure, you obtain the information (along with the ANOVA table) for computing the multiple range tests. Table 1 presents these results.

To load the appropriate information into ONEWAY, use the MATRIX option of the DATA LIST procedure. When using the MATRIX option, it is recommended that you use FREE format unless you are reading matrix output from one procedure back into the same procedure. For this example, the relevant commands to read the matrix data, label the cells, and produce the range tests are:

```
DATA LIST MATRIX FREE/ YIELD
CELLS
VALUE LABELS CELLS 1 'VAR1M1' 2
'VAR2M1' 3 'VAR3M1' 4 'VAR4M1' 5
'VAR5M1' 6 'VAR1M2' 7 'VAR2M2' 8
'VAR3M2' 9 'VAR4M2' 10 'VAR5M2' 11
'VAR1M3' 12 'VAR2M3' 13 'VAR3M3'
14 'VAR4M3' 15 'VAR5M3'
DISKCOPY: supports the 3.5" 720Kb
diskette.
6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
21.77 21.85 23.13 25.97 22.33 15.08 15.23
15.45 13.50 19.22 18.42
19.92 17.32 14.83 12.55
19.650
75
END DATA
ONEWAY YIELD BY CELLS(1,15)/
RANGES=SNK / OPTIONS 6 8
```

¹ There is no special significance to the fact that the data originated in a SAS manual. It was simply a handy source for some data.

Table 1: ANOVA YIELD BY METHCODE(1,3) VARIETY(1,5) /STAT 3.

*** CELL MEANS ***

YIELD BY METHOD VARIETY TOTAL POPULATION 18.44 (90)					
METHOD	VARIETY				
	1	2	3	4	5
1	21.77 (6)	21.85 (6)	23.13 (6)	25.97 (6)	22.33 (6)
2	15.08 (6)	15.23 (6)	15.45 (6)	13.50 (6)	19.22 (6)
3	18.42 (6)	19.92 (6)	17.32 (6)	14.83 (6)	12.55 (6)

*** ANALYSIS OF VARIANCE ***

YIELD BY METHOD VARIETY					
Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main Effects	964.537	6	160.756	8.181	.000
METHOD	953.156	2	476.578	24.253	.000
VARIETY	11.380	4	2.845	.145	.965
2-way Interactions	374.488	8	46.811	2.382	.024
METHOD VARIETY	374.488	8	46.811	2.382	.024
Explained	1339.025	14	95.645	4.867	.000
Residual	1473.767	75	19.650		
Total	2812.792	89	31.604		

This DATA LIST will read MATRIX data in FREE format, and will store the variable names YIELD and CELLS for use in the ONEWAY procedure later, even though these names do not relate directly to the raw data read by the DATA LIST. The first line of data is a vector of the cell frequencies for each of the 15 cells in the interaction between the METHOD and VARIETY variables. The second, third and fourth lines are the 15 cell means (if you run out of room on one line, you may con-

tinue on the next). The next two lines are the Residual Mean Square and its degrees of freedom.

By using OPTION 8 in the ONEWAY procedure, SPSS-PC + can read data in this format. Also, it is helpful to label the cells for ease of interpretation of the range test output. In order for ONEWAY to pay attention to these labels, you must also use OPTION 6 in ONEWAY. The output from this procedure is be similar to that obtained by running the standard multiple range test with

the simpler one-way design. (Only partial output follows, appearing in Table 2. A subset of the variables not involved in significant differences was excluded to save space.)

Consult *Multiple Comparison* by Alan Klockars and Gilbert Sax (#61 of the Sage series on Quantitative Applications in the Social Sciences) for help in deciding which of the several available multiple range tests meets your needs and for which your data are appropriate. ♦

Table 2: Multiple Range Test

Student-Newman-Keuls Procedure
Ranges for the .050 level -

2.83 3.38 3.72 3.95 4.14 4.28 4.41 4.52 4.61 4.69
4.77 4.84 4.90 4.96

The ranges above are table ranges.

The value actually compared with Mean(J)-Mean(I) is..

$$3.1345 * \text{Range} * \text{Sqrt}(1/N(I) + 1/N(J))$$

(*) Denotes pairs of groups significantly different at the .050 level

[illegible]

Once that has been done, you should check your list against the features of high-end word-processing systems such as Word Perfect and Microsoft Word. In many instances, these products will handle all the tasks you wish to accomplish. The May 1988 issue of BYTE magazine has an article entitled "Word Processors for Desktop Publishing" that discusses the abilities of 10 different word processing systems. This would be a good place to start in your assessment of word processors versus "true desktop publishing systems."

If you decide that you really do need a desktop publishing product, there are still many more decisions to be made. The remainder of this article is aimed at helping you to make these decisions.

Desktop Publishing Products

There are many products on the market that claim to offer desktop publishing capabilities. Many are WYSIWIG (What-you-see-is-what-you-get) systems, although some are command driven (dot command sequences are imbedded within the text of the document). WYSIWIG systems are generally considered to be "state-of-the-art," and the presence or absence of this feature should be con-

Choosing a Desktop Publishing System

By Claudia Lynch, *Benchmarks*
Editor (AS04@NTSUVMI)

One of the questions I am asked most frequently goes something like:

I am interested in purchasing some desktop publishing software, but I am unsure as to which one to buy. Can you please help me?

I decided to write this article in an effort to save myself both time and

Desktop publishing is a fairly new microcomputer application. During its short existence, however, two products have become what could be called "industry standards." These products are Aldus Corp.'s PageMaker and Xerox Ventura Publisher ...

breath, and to provide a more comprehensive answer than I am usually able to give in person.

Establishing a Need for Desktop Publishing

The first thing I would advise a potential desktop publisher to do is to make sure they really need a desktop publishing product. This involves outlining the tasks you want to accomplish, both now and in the future.

sidered carefully when evaluating a desktop publishing product. If you are planning to do "serious" desktop publishing, you should probably buy a product that is WYSIWIG.

Desktop publishing is a fairly new microcomputer application. During its short existence, however, two products have become what could be called "industry standards." These products are Aldus Corp.'s Page-Maker and Xerox Ventura Publisher,

both WYSIWIG systems. Any features noted lacking in either of these two products may be present by the time this answer is published, due to the constantly changing nature of the microcomputer software industry. Disclaimers aside, the following comparison and contrast of Ventura Publisher (Version 1.1) and PageMaker (Version 1.0) should be of some help to you in making your decision. Please note that, in an effort not to complicate things more than necessary, the version of PageMaker that is reviewed here is for use on an IBM PC.

Microcomputer Configuration

- Xerox Ventura Publisher will operate on an IBM PC, PC XT, PC AT, and compatibles. It requires a 20MB hard disk (at least), a 360K disk drive, 512K bytes of RAM (640K recommended), DOS 2.1 or later, and a graphics display adapter such as the Her-

Xerox Ventura Publisher will operate on an IBM PC, PC XT, PC AT, and compatibles.

Aldus Corp.'s PageMaker was originally written to run on an Apple Macintosh. It has recently become available for IBM PCs.

cules or EGA cards. CGA cards are supported but not recommended due to the poor level of resolution that they provide.

Ventura Publisher uses 1 to 3 megabytes of disk space, depending on the printer fonts installed. It is bundled with a run-time version of Digital Research's GEM which is transparent to the user, although it can be run from GEM desktop.

Xerox Ventura Publisher takes a document-oriented approach to page layout. This makes it particularly good for producing lengthy publications

- Aldus Corp.'s PageMaker was originally written to run on an Apple Macintosh. It has recently become available for IBM PCs. PageMaker requires an AT class machine with 512K bytes of RAM (640K recommended), a 20 MB hard disk (at least), a 360K disk drive, DOS 3.2 or later, and a graphics display adapter such as the Hercules or EGA cards. CGA cards are supported but not recommended due to the poor level of resolution that they provide.

PageMaker is bundled with a run-time version of Windows, however you can run it under a full version of Windows to take advantage of the task switching feature that would let you switch from PageMaker to Windows Paint or Draw and back again without quitting PageMaker.

Although technically not required, even the most casual use of either Ventura Publisher or PageMaker will require you to get a mouse or some sort of pointing device. Make sure the pointing device you choose was designed for use with your particular type of PC and is supported by your desktop publishing product.

Ventura Publisher and PageMaker both support a variety of full-page displays. You might want to consider the purchase of such a display if you are planning to spend the majority of your time doing desktop publishing. Make sure that you get a demonstration of the display using your desktop publishing product. Also ask to see what it looks like when you are not doing desktop publishing. The appearance of the screen in an environ-

ment that does not support the monitor (such as your word processing package, your spreadsheet, etc.) is an important consideration for many people who do not do desktop publishing full-time.

Text Formatting Features

- Xerox Ventura Publisher takes a document-oriented approach to page layout. This makes it particularly good for producing lengthy publications. Ventura offers multiple views of the page, including a reduced view, which shows a mock-up of the entire page, a normal view (100 percent), and an enlarged (200 percent) view. A facing-pages option, which allows you to see two consecutive pages in a publication at the same time, is also available.

A document produced with Ventura Publisher represents a composite of several files, including text, graphics, and style sheets.

Aldus Corp.'s PageMaker takes a page-oriented approach to page layout. This is particularly good for applications such as short newsletters, brochures, advertisements, and other publications that require high quality graphics and have pages of differing formats.

The Ventura document file does not actually hold text or graphics but rather holds pointers to the DOS files that hold the text or graphics and styles. This gives Ventura documents a dynamic nature. Their format can be changed instantaneously by calling in a new style sheet and their content can be immediately updated by

editing the text files that compose it.

It is possible to create and edit text within Ventura, but extensive text editing should be done with a full featured word processing program. Ventura can format up to 50 pages per chapter in a 512K system and over 150 pages per chapter in a 640K system. A "multiple chapter" function allows you to assemble many chapters into a very large publication. Ventura automatically rennumbers pages and recreates the index and table of contents to reflect the sequence of chapters in the publication, and the entire publication can be printed at one time.

- Aldus Corp.'s PageMaker takes a page-oriented approach to page layout. This is considered to be particularly good for applications such as short newsletters, brochures, advertisements, and other publications that require high quality graphics and have pages of differing formats. Multiple document views are available, including a full-page reduced view, 50 and 75 percent, actual size, and 200 percent enlargement.

An internal text editor is available, although extensive editing should be done with a full featured wordprocessing program. PageMaker can theoretically accommodate a document up to 128 pages long. This would be impractical, however, due to the page-by-page orientation of the program. It can often take several seconds to redraw the screen after editing an image or turning the page.

Document Formats Supported

- Xerox Ventura Publisher will import text from WordStar, Microsoft Word, MultiMate, WordPerfect, XyWrite, and Xerox Writer. Standard text files in ASCII and DCA format are also supported.
- Aldus Corp.'s PageMaker will accept text files produced with

WordStar, Microsoft Word, MultiMate, WordPerfect, XyWrite, and Windows Write. Standard text files in ASCII or DCA format are also supported.

Graphics

- Xerox Ventura Publisher will import Line art from GEM Paint and Draw program, Lotus 1-2-3, PC Paintbrush, AutoCAD, Mentor Graphics, and Video Show. It also supports numerous standard graphics formats including Hewlett-Packard Graphics Language, GSS's Computer Graphics Metafile, Macintosh Paint and PICT formats, and encapsulated PostScript (EPS). Ventura Publisher will incorporate images scanned with Microtek, Dest, Datacopy, Hewlett-Packard, Advanced Vision Research, and compatible scanners into Ventura Publisher documents. It DOES NOT support the TIFF format, discussed below.

Graphics functions within Ventura Publisher allow you to create lines, boxes, shades and circles. Once you have placed a graphic in a frame within your document, you can crop, scale, or pan it.

- Aldus Corp.'s PageMaker can import graphic images from AutoCAD, Windows Paint and Draw, Lotus 1-2-3, Symphony, PC Paintbrush, PC Paint, and In a Vision. It also supports scanned images stored in EPS or TIFF (Tag Image File) format. This last feature gives PageMaker the ability to incorporate professional-quality black-and-white photographs and, given a high-resolution output device, produce photos that are of equal quality to those seen in major news magazines.

Graphic functions available within PageMaker include tools for drawing lines, rectangles, circles and ellipses. A wide variety of rule weights, borders and fill patterns are available and you can choose from among three types of double rules, one triple rule, five types of

broken rules, eight different thicknesses of single rules, and a reverse (white on black - if your printer supports it) rule. You can also specify the degree of roundness of the corners in rounded rectangles.

Once your graphics images are placed on a page they cannot be edited. They can be cropped and scaled, however. Both proportional scaling and anamorphic (distorted) scaling are supported.

Printers

- Xerox Ventura Publisher supports PostScript, Interpress, Hewlett-Packard LaserJet Plus, Xerox 4045, and Cordata laser printers. Laser printers that use the J Laser card and the Xerox 4020 color ink-jet printer are also supported. Some dot-matrix printers are supported but are not recommended due to their lack of speed and mediocre resolution. Almost any font and point size available on the selected output device can be used with Ventura Publisher, and you don't have to reformat a document if you decide to change output devices.
- Aldus Corp.'s PageMaker supports any output device that runs under Microsoft Windows (PageMaker's operating environment). These devices include Hewlett-Packard's LaserJet, the Apple LaserWriter, and many others. A PageMaker document is tied to the printer when the document is created. If you change your target printer you have to reformat your document.

Cost

- Xerox Ventura Publisher Version 1.1 has a list price of \$895.
- Aldus Corp.'s PageMaker Version 1.0 has a list price of \$695.

Both products can be purchased for substantially less from mail order catalogues or discount software establishments such as Soft Warehouse.

Which one is for you?

Here is what some industry professionals recommend:

Jim Cavuoto of BYTE Magazine (December 1987, p. 176) puts it this way:

PageMaker is a very good buy if you need an easy-to-use product that can produce top-notch designs. It is particularly appropriate for newsletter editors and professionals who have had previous experience with graphic design.

For advanced desktop publishing users, the features and on-screen performance of Ventura Publisher would be hard to find anywhere else. This product will probably occupy the top spot in high-performance desktop publishing for some time to come.

"The possible applications of desktop publishing are far too broad for one package to be everyone's ideal."

The PC Magazine Editor's Choice (February 10, 1987, p. 124) was Ventura Publisher - #1; Aldus Corp.'s PageMaker PC edition - #2:

The possible applications of desktop publishing are far too broad for one package to be everyone's ideal. As a result, we have chosen two packages, each better suited for a particular kind of publication.

The package that is best suited for handling longer publications is Ventura Publisher from Xerox Corp. Users with typesetting and professional publishing backgrounds will appreciate the program's style sheets and its ability to control kerning and leading in decimal increments. Professional authors or publication departments that expect the manuscript to change throughout the production cycle will be grateful for the program's permanent link between the word processing file and the document file and its automatic numbering for sections, figure captions, and footnotes.

Ventura's incorporation of downloadable fonts for the Hewlett-Packard Laserjet Plus is especially good news for those of us who were concerned that we would have to invest in a PostScript printer to get more typefaces. This "plus" is related to one of Ventura's drawbacks, however: fonts take up memory, and so the more fonts you use, the smaller your document must be.

Our unofficial second choice is Aldus Corp.'s new PC edition of PageMaker. There were a few bugs in the prerelease version, most notably problems printing bit-mapped images on the laser printer. But PageMaker's intuitive menus and direct methods of text formatting, along with its wide range of fonts, line styles, and fill patterns, make it an ideal package for graphic artists and other nontechnical users. Its pasteboard work area makes it especially easy to experiment with different page layouts before deciding on a final design. We would recommend PageMaker for shorter documents or long documents that will go through minor revisions after page layout.

Further Assistance

A variety of organizations have emerged in the recent past that will be glad to assist you in the process of choosing a desktop publishing system. One of these is EPOCENTER at INFOMART in Dallas. It is billed by INFOMART as a "first-of-its-kind business resource that brings all the elements of electronic publishing together under one roof." The services that EPOCENTER provides are free. For more information call 214-746-INFO or 800-367-7100.

If you have a large budget, you might consider attending a workshop. Battelle Memorial Institute, for example, is offering a two-day workshop on Desktop Publishing in Dallas on July 14-15 for \$695. For more information call 800-426-6762.

References

- Burns, Diane and S. Venit, "Muscling In on the MAC: PC-Based PageComposition," PC Magazine, February 10, 1987, pp. 119-156
- Cavuoto, James, "Three PC-based Desktop-Publishing Programs," BYTE, December 1987, pp. 169-176
- Gibson, Mary Margaret, "Ventura vs. PageMaker," Texas Computing, May, 1987, pp. 22-25
- Sorensen, Karen, "PC Page Layout Program Uses Gem," Infoworld, March 3, 1986, p. 5
- Wood, Lamont, "Word Processors for Desktop Publishing," BYTE, May 1988, pp. 102-116. ♦

Micro-Tips

This column is intended to serve as a forum for sharing useful tips on making more productive use of microcomputers. If you have a tip that you feel may be of use to campus users, submit it to the BENCHMARKS editor for possible inclusion in a future issue.

Differences in DOS Versions

Definition of DOS

DOS stands for Disk Operating System. A disk operating system serves as an interface between the user (us) and the computer hardware (microcomputer). DOS provides us with the necessary facilities for managing data or files. In essence, DOS manages most computer operations by interpreting commands that we have entered and transforming them into machine readable instructions that the computer can use.

Types of DOS

There are two primary types of DOS for the IBM class of machines. The most common DOS for IBM clone computers is Microsoft DOS, sometimes called MS-DOS. The other form of DOS, which should be used solely by true IBM microcomputers, is IBM personal computer DOS, referred to as PC-DOS.

DOS Differences

Many people wonder why there are so many different versions of DOS. You may be satisfied with whatever version of DOS you currently have, but the people at Microsoft Inc. continue to improve their product, releasing new versions of DOS in a timely manner. It is important, therefore, to understand what the major differences between DOS versions 3.1, 3.2, and 3.3 (the latest).

DOS 3.1

DOS 3.1 was released in February of 1985 with two new commands: JOIN and SUBST.

JOIN - allows you to connect a drive to a directory on a separate drive. This permits access to files on more than one drive while using only one drive specifier.

SUBST - allows you to substitute a drive letter for a drive or directory.

The **LABEL**, **TREE**, and **LINK** commands were enhanced, but the primary change in DOS 3.1 over DOS 3.0 was the ability to use DOS commands in conjunction with IBM PC network disks, directories, and printers. These enhancements are essential to IBM network users.

DOS 3.2

DOS 3.2 contains the additional commands: **REPLACE** and **XCOPY**.

REPLACE - allows you to selectively change versions of DOS.

XCOPY - allows you to copy a whole directory including lower level subdirectories. It is a faster copy utility than the internal DOS **COPY** command, because it copies to RAM first and then the source media.

There are also some interesting enhancements to existing DOS commands. Here is a short synopsis:

COMMAND: allows you to set the size of the environment that DOS will utilize.

DISKCOMP: supports the 3.5" 720Kb diskette.

DISKCOPY: supports the 3.5" 720Kb diskette.

FORMAT: prevents you from formatting the default drive unless you have specifically entered the drive letter.

DOS 3.3

DOS 3.3, which was released in April of 1987, contains four new commands: **APPEND**, **FASTOPEN**, **NLSFUNC**, and **CHCP**.

APPEND - locates files outside of the current directories that have an extension name of either

.BAT, **.COM**, and **.EXE**. It is very similar to the **PATH** command.

FASTOPEN - stores in memory (RAM) a list of the locations (addresses) of directories and files that were recently opened. When accessing a file **FASTOPEN** first searches memory; if the file is in the list, it is found very quickly.

NLSFUNC - (see the IBM DOS 3.3 manual to determine usage)

CHCP - (see the IBM DOS 3.3 manual to determine usage)

There are some interesting enhancements to existing the MS-DOS commands **FORMAT**, **BACKUP**, **TIME**, and **DATE**. Here is a general overview:

FORMAT: The **FORMAT** command now has the ability to format normal density 3 1/2" diskettes to 720K and high density 3 1/2" diskettes to 1.44Mb. To format a high density 3 1/2" diskette to 720K using a 3 1/2" high density drive use the following command:

FORMAT A:/N:9/T:80

To format a 5 1/4" disk to 360K in a 1.2Mb drive use the following command:

FORMAT A:/4

Otherwise, if your going format a high density 3 1/2" or a high density 5 1/4" disk and you are using a high density drive then type the following command:

FORMAT A:

BACKUP: The **BACKUP** command will backup files to an unformatted disk. To achieve this you must use the following option flag on your backup command. For instance if you wanted to backup all of the subdirectories on the hard disk to a floppy disk use the following command:

BACKUP C: A:/S/F (where the /F specifies format)

TIME: The **TIME** command used to set the machines clock only for the period of time that the computer was on. Now after the **TIME**

command is issued the computer's internal clock is permanently set to the time entered.

DATE: The **DATE** command used to set the machines clock only for the period of time that the computer was on. Now after the **DATE** command is issued the computer's internal clock is permanently set to the date entered.

If you enjoy playing with **.BAT** files, then you will love this next enhancement. The most useful enhancement to DOS 3.3 is the ability to run a **.BAT** file from within another **.BAT** file without executing **COMMAND.COM**. For example, in your **AUTOEXEC.BAT** you can invoke another **.BAT** file. When the second **.BAT** file finishes executing, control is returned to your initial **.BAT** file. (**AUTOEXEC.BAT**)

NOTE: For a more detailed description on any of the commands and enhancements discussed here please refer to an MS or PC-DOS manual. ♦

The Argument

A doctor, an architect, and a computer scientist were arguing about whose profession was the oldest. In the course of their arguments, they got all the way back to the Garden of Eden, whereupon the doctor said, "The medical profession is clearly the oldest, because Eve was made from Adam's rib, as the story goes, and that was a simply incredible surgical feat."

The architect did not agree. He said, "But if you look at the Garden itself, in the beginning there was chaos and void, and out of that, the Garden and the world was created. So God must have been an architect."

The computer scientist, who had listened to all of this said, "Yes, but where do you think the chaos came from?"

VAX COMPUTER CLUSTER

VAX File Protections

By Billy Barron, Acting VAX
System Manager (BILLY@NTSUVAX)

Occasionally in a research or class situation you will need to share your files with other users on the VAXcluster. Access to your files is controlled by setting the files' protection parameters. To see the current protection levels of your files, use the **DIR/PROTECTION** command. There will be four areas over to the right side similar to the following:

```
A.FILE;1 (RWED,RWED,,RWED)
```

The first set of characters shows **SYSTEM** access (for backups,mail,etc). The second set shows **OWNER** access (you). The third set shows group access (the people in your class if you have a class account). Group has no meaning on individual and faculty accounts. The fourth set shows world access (everybody else). **R** stands for read, **W** stands for write, **E** stands for execute, and **D** stands for delete. On **A.FILE**, therefore, the system, owner, and world have read, write, execute, and delete access to the file. The group has no access.

To change your files' protection, use the **SET PROTECTION** command. For example, to turn off all of world access (each command below should actually be contained on a single line) enter :

```
$ SET PROTECTION=(WORLD)
filename.ext
```

To make a file just world readable enter:

```
$ SET PROTECTION=(WORLD:R)
filename.ext
```

To make a file world readable and executable enter:

```
$ SET PROTECTION=(WORLD:RE)
filename.ext
```

You can replace **WORLD** in the above examples with **SYSTEM**, **OWNER**, or **GROUP** to change those access modes. It is recommended that you leave **SYSTEM** access as is, so that your directory can be backed up and so that you can receive **MAIL**. It is also recommended that you don't give delete or write access to **GROUP** or **WORLD**.

Please note that when you allow others access to your files, you need to also give them access to your directory so that they can find the files. The command you use is:

```
$ SET PROTECTION=(WORLD:R)
[-userid.DIR
```

You will need to replace *userid* with your directory name and replace **WORLD** with the correct access mode. ♦

CPU Upgrade

By Billy Barron, Acting VAX
System Manager (BILLY@NTSUVAX)

Many of VAXA's CPU boards were upgraded by Digital Equipment Corp. (DEC) during Spring Break. These new boards should greatly improve the reliability of the machine. VAXB went through the same upgrade several months ago.

DEC performs these upgrades as part of NTSU's service contract on the VAXen. The VAX tape drive will be upgraded some time in April. ♦

Public Directories

By Darrell Davis, VAX Operator
(DARRELL@NTSUVAX)

Many directories exist on the VAX that are open to you, the public. Some of the files are informational and some are public domain software. An entire disk drive is devoted to public software. This drive is **DUA1**. Before exploring this drive, let's make the job of directory traversal a little bit easier.

Directory Traversal

A very nice 'set default' program exists in one of the public directories. To copy the file to your directory, type (from the \$ prompt):

```
COPY SYSS$PUBLIC:DOWN.COM *.*
```

This will copy the file **DOWN.COM** to your directory. Next you will need to define two symbols in your **LOGIN.COM** file. I have the following in my **LOGIN** file:

```
SD := = "@DOWN"
```

```
↑ Runs DOWN.COM
```

```
UP := = "SET DEFAULT [-]"
```

```
↑ sets your default directory to
the 'parent' of your present
directory
```

Here is a quick run-down on using the above two commands. Suppose, for example, that you want to go move the directory:

```
DUA1:[PUBLIC.NETWORKS.BITNET]
```

Here are several possible methods:

```
SD SYSS$BITNET
```

```
↑ this uses a logical discussed
later in this article.
```

SD DUA1:PUBLIC.NETWORKS.BITNET
SD DUA1:PUB.NET.BIT

↑ note the abbreviations

SD BIT

↑ if you are already in
[PUBLIC.NETWORKS]

If you are in DUA1:[PUBLIC.NETWORKS.BITNET] and you want to go up one level directory to DUA1:[PUBLIC.NETWORKS] then you would type:

UP → puts you up to the 'parent' directory

Pretty easy, huh ? Now for an explanation of 'SYSS\$BITNET'. We have set up certain 'logicals' that point to directories that are often accessed. Some of these that might be of interest are:

Logical	Directory Pointed To
SYSS\$PUBLIC	DUA1:[PUBLIC]
SYSS\$INFO	DUA1:[PUBLIC.INFO]
SYSS\$NETINFO	DUA1: [PUBLIC.NETWORKS]
SYSS\$BITNET	DUA1: [PUBLIC.NETWORKS .BITNET]
DECUS	DUA1:[DECUS]
SYSS\$LOGIN	your home directory

So instead of typing SD DUA1:[PUBLIC] every time we want to go to that directory, we can type SD SYSS\$PUBLIC. (NOTE: You can define logicals for your own directories too. Type HELP GETTING_STARTED and consult the topic LOGICAL_NAMES.)

PUBLIC DIRECTORIES

Now we are ready to look around DUA1. The drive is more or less divided into two major directories:

- 1) DUA1:[DECUS]
- 2) DUA1:[PUBLIC]

DECUS is a VAX users organization that provides public domain software to its members. The DECUS directory contains games, utilities, etc., some of which may not work, some of which may require privilege to run, but most of which you can use. To

look at the DECUS files, set the default directory to the DECUS directory by typing:

SD DECUS

If you now type DIRECTORY you will get a list of hundreds of subdirectories. You could just start "SD'ing" to all the directories and looking around but first you may want to look at the directory VAX000 (type: SD VAX000). In this directory you will find a bunch of 'AAAAREADME' files. These files contain descriptions of most of the utilities, games, and other files that are contained in the DECUS directory. One more DECUS directory is DECUSC, containing many 'C' language routines. From the DECUS directory (DUA1:[DECUS]) type:

UP

SD DECUSC

Next we will look at the PUBLIC directory, so type: SD SYSS\$PUBLIC. This puts you in DUA1:[PUBLIC]. If you type DIRECTORY you will see a bunch of directories and files (including DOWN.COM !). The PUBLIC directory is chock full of VAX related information and programs. Feel free to copy interest-

ing files to your directory (type: COPY interesting.filename SYSS\$LOGIN)

Be careful not to exceed your disk quota (we really can't give you more quota to accommodate copying files from PUBLIC). Below are some interesting directories in DUA1:[PUBLIC]:

DUA1:[PUBLIC.HUMOR]
computer humor

DUA1:[PUBLIC.INFO]
various informational files

DUA1:[PUBLIC.INFOVAX]
INFO-VAX mailing list archives

DUA1:[PUBLIC.NETWORKS]
network information, many sub-directories

DUA1:[PUBLIC.RTL]
routines to access VAX Run-Time Libraries

DUA1:[PUBLIC.VAXHELP]
VAX help (!)

The best way to learn about VAX/VMS is to study all the topics in HELP. The second best way is to spend some time looking at the files on the disk DUA1. Hopefully by doing the above you can gain a little insight to VAX operations and applications and maybe make your VAX experience more enjoyable. ♦

VAX CLUSTER USAGE STATISTICS

February Top Ten Programs: Frequency of Runs

Program	Description	Number of Runs	Percent of Total
1. LOGINOUT	User login	74588	14.0
2. SET	VMS Utility	66092	12.4
3. DELETE	VMS Utility	43873	8.2
4. TYPE	VMS Utility	43614	8.2
5. EDT	Editor	40826	7.7
6. DIRECTORY	VMS Utility	38638	7.2
7. SHOW	VMS Utility	29924	5.6
8. PASCAL	PASCAL Compiler	23782	4.5
9. User Programs	Compiler Programs	19369	3.6
10. SEARCH	VMS Utility	19064	3.6
Total		533266	

February Top Ten Programs: CPU Time Used

Program	Description	CPU Time	Percent of Total
1. User programs	Compiled Programs	7 20:29:09.80	42.9
2. EDT	Editor	1 16:54:09.12	9.3
3. PASCAL	PASCAL compiler	1 03:23:59.29	6.2
4. BACKUP	VMS Utility	0 14:40:23.35	3.3
5. ACC	VMS Accounting Utility	0 12:10:13.85	2.8
6. MONITOR	VMS Utility	0 10:18:40.78	2.3
7. LISP	LISP Interpreter	0 10:11:40.79	2.3
8. LOGINOUT	User login	0 10:01:38.88	2.3
9. SYSTAT	System Status Utility	0 10:01:38.88	2.0
10. RTPAD	Remote Login Utility	0 07:44:41.97	1.8
Total		18 07:44:41.97	

March Top Ten Programs: Frequency of Runs

Program	Description	Number of Runs	Percent of Total
1. SET	VMS Utility	60365	12.0
2. LOGINOUT	User login	59150	11.8
3. DELETE	VMS Utility	49968	10.0
4. TYPE	VMS Utility	44798	8.9
5. DIRECTORY	VMS Utility	38459	7.7
6. EDT	Editor	36669	7.3
7. SHOW	VMS Utility	25779	5.1
8. PASCAL	PASCAL Compiler	22130	4.4
9. User Programs	Compiler Programs	20215	4.0
10. SYSLOGIN	User Login	16597	3.3
Total		501169	

March Top Ten Programs: CPU Time Used

Program	Description	CPU Time	Percent of Total
1. User programs	Compiled Programs	3 13:46:16.78	20.4
2. MAXCLAS	ERDAS Utility	3 06:00:18.29	18.5
3. EDT	Editor	1 16:50:36.76	9.7
4. PASCAL	PASCAL compiler	1 15:42:39.96	9.4
5. ACC	VMS Accounting Utility	0 16:10:17.36	3.8
6. BACKUP	VMS Utility	0 15:54:16.84	3.5
7. LINK	Linker	0 14:34:04.97	3.5
8. XYZZY	BITNET Chatting Utility	0 10:09:15.73	2.4
9. LOGINOUT	User login	0 08:56:44.50	2.1
10. TDP	PACS + Billing Utility	0 06:28:41.72	1.5
Total		18 07:44:41.97	

VAX Notes**SHOWROUTE Command Renamed**

The SHOWROUTE command has been renamed to FINDNODE. The FINDNODE command searches for BITNET nodenames or locations. This same command is available on MUSIC. Type HELP FINDNODE for more information.

PATH Command Updated

The PATH command to find routes between BITNET sites has been updated. It now runs much faster and uses the current nodename as the default if you only give it a single parameter. There is no longer any interactive mode for this utility. For more information type HELP PATH.

TELNET Utility Installed

A utility called TELNET has been installed that allows you to connect your terminal to an Internet host. Local hosts include the NBI and the Research VAX. Type HELP TELNET for more information. ♦

Computer Joke of the Month

Q: How many IBM types does it take to change a light bulb?

A: 100. Ten to do it, and 90 to write document number GC7500439-001, Multitasking Incandescent Source System Facility, of which 10% of the pages state only "This page intentionally left blank," and 20% of the definitions are of the form ".of 4;A: consists of sequences of non-blank characters separated by blanks."

ADMINISTRATIVE INFORMATION SYSTEMS

PROJECT EAGLE: The NTSU and GTE Voice Response Project

By Coy Hoggard, Manager,
Administrative Information Systems

NTSU has entered into a five year agreement with General Telephone and Electric (GTE) to develop five voice response applications for the higher education market. For these applications, touch-tone telephones will be used as data collection and query devices into automated administrative information systems. By working with GTE and functioning as something of a laboratory for the development and use of these products, NTSU will receive significant benefits in the form of free use and eventual ownership of the products.

The product which GTE is developing is called, generically, "UCAP," which stands for "University and College Applications Processor." UCAP consists of both the hardware and software to allow end-users to access computer-based information systems using a touch-tone telephone. The hardware consists of a mini computer, appropriate telephone equipment, and the software required to allow the mini computer to access the administrative mainframe computer for purpose of electronic information exchange. All the components of UCAP are proprietary to GTE.

The entire five-year project is called "Project Eagle." The first application of Project Eagle is the Telephone Registration (Teleregistration) application. Teleregistration allows stu-

dents to use touch-tone telephones to call into the administrative mainframe computer via UCAP to schedule classes. There are a series of computer generated voice instructions that guide the student through each step of the process. Phase I of Teleregistration consists of the scheduling component. Work began on this project in August, 1987. This spring, College of Education majors are serving as a pilot test group for the implementation of Phase I of Teleregistration. Dr. Betty Mason, Director of Student Services, has been named Academic Coordinator for the project. These students (College of Education majors) will use Teleregistration to early register for their Summer and Fall, 1988 classes in lieu of using the traditional "bubble sheet" method. According to Joneel Harris, Registrar and Teleregistration Project Manager, packets containing instructions, worksheets, and class schedules for Summer and Fall, 1988 semesters have been mailed to 3,678 students whose majors are in the College of Education. Ms. Harris estimates that at least 2,300 of these students will actually use the system this spring. ♦

Wanted: Telex Terminals

The Computing Center has a need for additional Telex terminals. Any department that has terminals that they wish to transfer, sell, or trade, contact Coy Hoggard or Stanley Sawyer at extension 2324.

Production Services Group Formed

By Coy Hoggard, Manager,
Administrative Information Systems

The Data Entry, Report Preparation/Distribution, and Data Control functions have recently been consolidated into a single group within Computer Operations. The new section is called "Production Services." The Production Services Supervisor is Betty Grise, who formerly supervised the Data Entry and Report Processing/Distribution functions. Specifics of the organization of the Production Services section are as follows:

- The Production Services Supervisor will have general management and supervisory responsibility for the section. Betty Grise has been appointed to the position of Production Services Supervisor. Betty reports to Rabon Sanders, Computer Operations Manager.
- The Data Entry section is under the general supervision of the Production Services Supervisor, with daily work assignments being coordinated by Rachel Dowdy, who has the title "Data Entry Coordinator." The Data Entry staff currently consists of Kay Prewitt, Nadine Yeager, Kathy Brush, Renate Roberts, and Judy Stensgard.
- The Report Preparation/Delivery function is now a part of the Production Services section and continues to be staffed primarily by student workers. Current staff members in this area are Rick Burley, Mike Herndon, and Kenneth La Rue.

- The three Data Control Assistant positions which formerly were a part of the Administrative Information Systems group have been re-named "Production Control Assistants" and are now a part of the Production Services section. These people are responsible for computer job submission, coordination, and quality assurance for applications which are in production status. The current Production Control Assistants are Trina Knight, Tim Moore, and Clay Pickering. ♦

TRANSITIONS

By Doug Heruska, Documentation Specialist

The Administrative Information Systems group has been involved in a period of dynamic change, as can be seen from the preceding articles in this section. In addition to staffing changes discussed elsewhere, the following people have contributed to the current dynamic nature of this group.

Bill Shumate, of the General Systems Team, decided to leave the computer world and venture into the restaurant business. We wish Bill the best of luck in his new undertaking and expect to be eating some good Mexican food in the near future.

Nancy Fisher, a local Denton resident who had been working for Moore Business Systems, has joined the General Systems Team in Bill Shumate's open position. Nancy has more than 10 years experience in data processing and is familiar with NTSU, since she is a former graduate and part time instructor in the BCIS department.

The Fiscal Team's Bob Hamilton has changed his status from part time to full time Programmer.

Benny Pena is a recent addition to the Student Records area. Benny is a recent graduate of West Texas State University, with a Computer Information Systems degree. He started in January as a Programmer. ♦

VACANT POSITIONS

Administrative Information Systems has the following vacant positions:

Office Automation Analyst: The person filling this position will be responsible for supporting "end-user computing" activities in a predominantly IBM-compatible microcomputing environment. Candidates for this position must have extensive experience with the MS/PC-DOS operating system and currently popular software such as Lotus 1-2-3, dBASE III, RBase, and WordPerfect. Applicants should also be familiar with microcomputer local area networks, especially Novell's Netware Operating System, and with micro-to-mainframe links. The position requires excellent written and verbal communications skills as well as excellent organizational abilities. Minimum requirements include five years of applicable computing experience (including two years as a Programmer/Analyst, Systems Analyst, or equivalent) and a bachelor's degree. An advanced degree or additional experience is desirable.

The following Programmer and Programmer / Analyst positions will do systems analysis, design, and development work as well as system and program maintenance. A bachelor's degree and experience with OS/MVS operating system, COBOL programming language, and ADABAS data base management system software is required or highly desirable for all of these positions:

Programmer/Analyst - Voice Response Applications: Will work on development of applications combining the use of touch-tone telephone technology (with voice response) with traditional electronic data processing. Touch-tone telephones will be used as data collection and query (with voice response) devices. Three to five years experience as a program-

mer or analyst in a medium or large scale computing environment is required.

Programmer/Analyst - Payroll / Personnel Data Systems: Will work on development of new Payroll/Personnel system to support NTSU and TCOM (Texas College of Osteopathic Medicine). Five or more years of applicable experience as a programmer or analyst is required.

Programmer/Analyst - Fiscal Data Systems: Will work on software maintenance and development projects primarily in support of student accounting functions. Three to four years of applicable experience as a programmer or analyst is required.

Programmer/Analyst - Student Records Data Systems: Will work on software maintenance and development projects primarily in support of student records applications. Three to four years of applicable experience as a programmer or analyst is required.

Programmers (3) - Student Records Data Systems: Will work on software maintenance and development projects primarily in support of student records applications. One year of applicable programming experience is required.

Programmer - Fiscal Data Systems: Will work on software maintenance and development projects primarily in support of student accounting functions. One year of applicable programming experience is required.

Programmer - General Data Systems: Will work on software maintenance and development projects in support of Financial Aid, Advancement, and other offices' functions. Two years of applicable programming experience is required.

Resumes and/or inquiries regarding these positions should be directed to the NTSU Personnel Office, P.O. Box 13497 NTSU, Denton, TX 76201, or call (817) 565-2281.

North Texas State University is an equal opportunity, affirmative action employer. ♦

COMPUTER SERVICES

Mainframe Performance Statistics

NAS/8083 Dual Processor Performance Statistics for January

CPU	SYSTEM	Scheduled Operating Hours	Planned Maintenance Hours	Planned Production Hours	Unplanned Maintenance Hours	Production Hours Achieved	System Uptime
ACAD	VM/SP3	744	0.00	744.00	0.00	744.00	100.0%
ACAD	MUSIC/SP	744	25.28	718.72	23.50	695.22	96.7%
ACAD	MVS/JES2	744	0.00	744.00	0.00	744.00	100.0%
ACAD	COMPLETA	744	0.00	744.00	2.80	741.20	99.6%
ADMN	MVS/JES2	744	0.00	744.00	0.20	743.80	99.9%
ADMN	COMPLETA	275	0.00	275.00	3.08	271.92	98.9%
ADMN	ADABASA	744	22.07	721.93	25.41	696.52	96.5%

System Uptime = (Production Hours Achieved) / (Planned Production Hours)

Production Hours Achieved = (Planned Production) - (Unplanned Maintenance)

Scheduled Operating Hours = (Planned Maintenance) + (Planned Production)

MUSIC/SP Planned Maintenance Hours include 19.56 hours for system backup and 5.72 hours for VM/SP3 system backup.

ADABASA'S Planned Maintenance Hours include 22.07 hours for system backup.

The ACAD CPU achieved 100% uptime; the NAS/7360 DASD achieved 100% uptime; the NAS/7380 DASD achieved 100% uptime. The ADMN CPU achieved 100% uptime; the NAS/7360 DASD achieved 100% uptime; the

NAS/7380 DASD achieved 100% uptime.

Lost productivity is calculated as the greatest amount of elapsed time that any one of the production

systems was unavailable for scheduled operation. Lost productivity hours were contributed to by the key causes appearing in the table below.

ACAD CPU:

Miscellaneous

- | | |
|-------------------------------------|------------|
| 1. COMPLETA system maintenance. | 2.80 HOURS |
| 2. MUSIC/SP upgrade to Version 1.2. | 23.50 |

TOTAL:	26.30 HOURS
GRAND TOTAL FOR ACAD	26.30 HOURS

ADMN CPU:

Miscellaneous

- | | |
|--|------------|
| 1. MVS/JES2 system tuning/improvements. | 0.18 HOURS |
| 2. ADABASA File Maintenance. | 27.65 |
| 3. COMPLETA system tuning/improvements. | 2.38 |
| 4. COMPLETA system down to process single jobs.. | 0.70 |

TOTAL:	30.91 HOURS
GRAND TOTAL FOR ADMN:	30.91 HOURS

NAS/8083 Dual Processor Performance Statistics for February

CPU	SYSTEM	Scheduled Operating Hours	Planned Maintenance Hours	Planned Production Hours	Unplanned Maintenance Hours	Production Hours Achieved	System Uptime
ACAD	VM/SP3	696	0.00	696.00	0.30	695.70	99.9%
ACAD	MUSIC/SP	696	35.55	662.45	2.05	660.40	99.7%
ACAD	MVS/JES2	696	0.00	696.00	2.52	693.48	99.6%
ACAD	COMPLETA	696	0.00	696.00	5.44	690.56	99.2%
ADMN	MVS/JES2	696	0.00	696.00	3.92	692.08	99.4%
ADMN	COMPLETA	269	0.00	269.00	0.67	268.33	98.8%
ADMN	ADABASA	696	20.15	675.85	4.17	671.68	99.4%

MUSIC/SP Planned Maintenance Hours include 20.17 hours for system backup and 13.38 hours for VM/SP3 system backup.

systems was unavailable for scheduled operation. Lost productivity hours were

contributed to by the key causes appearing in the table below.

ADABASA'S Planned Maintenance Hours include 20.15 hours for system backup.

The ACAD CPU achieved 100% uptime; the NAS/7360 DASD achieved 100% uptime; the NAS/7380 DASD achieved 100% uptime. The ADMN CPU achieved 100% uptime; the NAS/7360 DASD achieved 100% uptime; the NAS/7380 DASD achieved 100% uptime.

Lost productivity is calculated as the greatest amount of elapsed time that any one of the production

ACAD CPU:

Miscellaneous

- | | |
|---|------------|
| 1. COMPLETA system maintenance. | 2.31 HOURS |
| 2. MVS/JES2 system/tuning/improvementx. | 1.61 |
| 3. MUSIC/SP system failures | 1.59 |
| 4. MUSIC/SP system tuning/improvements. | 0.95 |

TOTAL:	6.46 HOURS
GRAND TOTAL FOR ACAD	6.46 HOURS

ADMN CPU:

Miscellaneous

- | | |
|---|------------|
| 1. Shut down operating systems for scheduled equipment maintenance. | 4.17 HOURS |
| 2. COMPLETA system down to process single jobs.. | 0.67 |

TOTAL:	4.84 HOURS
GRAND TOTAL FOR ADMN:	4.84 HOURS

NAS/8083 Dual Processor Performance Statistics for March

CPU	SYSTEM	Scheduled Operating Hours	Planned Maintenance Hours	Planned Production Hours	Unplanned Maintenance Hours	Production Hours Achieved	System Uptime
ACAD	VM/SP3	744	3.45	740.55	0.18	740.37	99.9%
ACAD	MUSIC/SP	744	42.06	701.94	2.56	699.38	99.6%
ACAD	MVS/JES2	744	3.92	740.08	0.78	739.30	99.9%
ACAD	COMPLETA	744	4.05	739.95	3.16	736.79	99.6%
ADMN	MVS/JES2	744	2.68	741.32	5.15	736.17	99.3%
ADMN	COMPLETA	303	0.00	303.00	0.42	302.58	98.9%
ADMN	ADABASA	744	21.09	722.10	10.38	711.72	98.6%

MUSIC/SP Planned Maintenance Hours include 24.23 hours for system backup and 14.28 hours for VM/SP3 system backup.

ADABASA'S Planned Maintenance Hours include 19.05 hours for system backup.

The ACAD CPU achieved 100% uptime; the NAS/7360 DASD achieved 100% uptime; the NAS/7380 DASD achieved 100% uptime. The ADMN CPU achieved 100% uptime; the NAS/7360 DASD achieved 100% uptime; the NAS/7380 DASD achieved 100% uptime.

Lost productivity is calculated as the greatest amount of elapsed time that any one of the production systems was unavailable for scheduled operation. Lost productivity hours were contributed to by the key causes appearing in the table at right.

ACAD CPU:

CPU, Tape, and Disk Subsystems (NAS)

- | | |
|--------------------------------------|------------|
| 1. Periodic Maintenance on ACAD CPU. | 4.05 HOURS |
|--------------------------------------|------------|

Miscellaneous

- | | |
|---|------|
| 1. COMPLETA system maintenance. | 2.16 |
| 2. MUSIC/SP system failures | 2.54 |
| 3. MUSIC/SP system tuning/improvements. | 0.67 |

TOTAL:	5.37 HOURS
GRAND TOTAL FOR ACAD	9.42 HOURS

ADMN CPU:

CPU, Tape, and Disk Subsystems (NAS)

- | | |
|--------------------------------------|------------|
| 1. Periodic Maintenance on ACAD CPU. | 2.85 HOURS |
|--------------------------------------|------------|

Miscellaneous

- | | |
|--|------|
| 1. COMPLETA system failures. | 0.42 |
| 2. ADABASA file maintenance. | 4.20 |
| 3.. MVS/JES2 system tuning/improvements. | 6.18 |

TOTAL:	10.80 HOURS
GRAND TOTAL FOR ADMN:	13.65 HOURS

DISK BACKUP SCHEDULES

OS/MVS Backup Schedule

OS/MVS disk packs (academic and administrative) are backed up daily, Tuesday through Saturday, from 4-6:30 a.m., and Sunday from Midnight to 3 a.m. A backup of all the operating systems on the NAS CPU and their contents is done once every two weeks at some low activity period over a weekend.

MUSIC/SP Backup Hours

A message will be sent to all users signed on to MUSIC/SP approximately 10 minutes before backups are begun. It will be in the form **MUSIC SHUT DOWN AT xxxx AM-SCHEDULED BACKUP**. To find out the backup hours while signed on to MUSIC/SP, enter **HELP HOURS**.

The following backup schedule is currently in effect:

Tuesday 3 a.m. (for about 3 hours)
Weekly backup
Wednesday - Saturday 4 a.m. (for about 2 hours) Daily backup
Saturday Midnight (for about 2 hours)
Daily backup

PHOENIX Backup Hours

PHOENIX is backed up weekly on Sunday night. The backup begins at midnight and lasts for approximately 30 minutes.

VAX Backup Schedule

Incremental backups of the VAXcluster are performed Monday through Thursday at 3 a.m. Users do not have to log-off, but any files that are open at the time of the backup will NOT be backed up.

Full backups of both systems are done every Friday beginning at 8 a.m. These generally will take all day to complete. Again, users do not have to log-off, but any files that are open will not be backed up.

A "Stand Alone" backup of the system disk is done once a month. This procedure makes a copy of the system disk that can be used to restore its contents if the disk is completely destroyed. The system will be shut-down for this. Watch the system log-on message for specific times and dates.

NOTE: Requests for restoration of files should be made via MAIL to the username OPERATOR. Your file can only be restored if it existed before the last backup was done. ♦

ACADemic (NAS) Program Hit Parade

January Top Ten Programs : Frequency Of Runs

Program	Description	Number of Runs	Percent of Total
1. IEBGENER	IBM Utility	3019	17.1
2. SCRIPT	Waterloo/SCRIPT	2449	13.8
3. IKJEFT01	Password Change	2109	11.9
4. SASLPA	SAS	1753	9.9
5. PTPCH	Dataset Lister	1430	8.1
6. SPSSX	SPSSX	1423	8.0
7. IEWL	Linkage Editor	675	3.8
8. PGM = *.DD	Compiled Program	667	3.8
9. IEFBR14	IBM Null Utility	443	2.5
10. IKFCBL00	VS COBOL Compiler	404	2.3

January Top Ten Programs: CPU Seconds Used

Program	Description	CPU Seconds	Percent of Total
1. SASLPA	SAS	11806	23.3
2. SPSSX	SPSSX	9732	19.2
3. SCRIPT	Waterloo/SCRIPT	7007	13.9
4. GIMSP	MVS Maintenance Utility	5174	10.2
5. FATS	Tape Verification Program	4213	8.3
6. PGM = *.DD	Compiled Program	1398	2.8
7. PTPCH	Dataset Lister	1351	2.7
8. IKJEFT01	Password Change	1101	2.2
9. FDR	MVS Disk Backup Utility	886	1.8
10. ADARUN	ADABAS Utility Module	719	1.4

February Top Ten Programs : Frequency Of Runs

Program	Description	Number of Runs	Percent of Total
1. IEWL	Linkage Editor	11263	17.5
2. PGM = *.DD	Compiled Program	11227	17.4
3. IKFCBL00	VS COBOL Compiler	6917	10.7
4. PTPCH	Dataset Lister	5246	8.1
5. SCRIPT	Waterloo/SCRIPT	5011	7.8
6. IEBGENER	IBM Utility	4689	7.3
7. SASLPA	SAS	3511	5.4
8. SPSSX	SPSSX	3262	5.1
9. IEV90	Assembler H	2150	3.3
10. IKJEFT01	Password Change	1384	2.1

February Top Ten Programs: CPU Seconds Used

Program	Description	CPU Seconds	Percent of Total
1. PGM = *.DD	Compiled Program	40952	29.1
2. SASLPA	SAS	27621	19.6
3. SCRIPT	Waterloo/SCRIPT	11236	8.0
4. GIMSP	MVS Maintenance Utility	10700	7.6
5. SPSSX	SPSSX	9872	7.0
6. IKFBL00	VS COBOL Compiler	8315	5.9
7. PTPCH	Dataset Lister	5838	4.2
8. ISTINM01	VTAM Utility	2711	1.9
9. FATS	Tape Verification Program	2442	1.7
10. RESOLVE	System Programming Tool	2334	1.7

March Top Ten Programs : Frequency Of Runs

Program	Description	Number of Runs	Percent of Total
1. IEWL	Linkage Editor	15876	16.8
2. PGM = *.DD	Compiled Program	15369	16.3
3. IKFCBL00	VS COBOL Compiler	14096	14.9
4. IEBGENER	IBM Utility	7793	8.3
5. IEBPTPCH	IBM List Utility	6110	6.5
6. SCRIPT	Waterloo/SCRIPT	5293	5.6
7. PTPCH	Dataset Lister	4934	5.2
8. IEV90	Assembler H	3904	4.1
9. ADARUN	ADABAS Utility Module	3581	3.8
10. SPSSX	SPSSX	3253	3.4

March Top Ten Programs: CPU Seconds Used

Program	Description	CPU Seconds	Percent of Total
1. SASLPA	SAS	134680	57.6
2. PGM = *.DD	Compiled Program	25475	10.9
3. SCRIPT	Waterloo/SCRIPT	16018	6.8
4. IKFBL00	VS COBOL Compiler	14926	6.4
5. SPSSX	SPSSX	9144	3.9
6. PTPCH	Dataset Lister	5834	2.5
7. ADARUN	ADABAS Utility Module	3587	1.5
8. IEV90	Assembler H	2903	1.2
9. IEWL	Linkage Editor	2526	1.1
10. ISTINM01	VTAM Utility	2504	1.1

The programs listed in this section were used the most frequently on the NAS CPU during the months of January, February, and March, 1988.

Please Note that ACAD is the official designation of the part of the NAS/8083 CPU that is dedicated to faculty and student use. The portion

of the computer reserved for University administrative purposes is termed ADMN. ♦

Get a Subscription to BENCHMARKS

Benchmarks is a vital link between the NTSU Computing Center and the users of our facilities. It is important for all users of the computing facilities to maintain a file of these newsletters because they contain materials which will periodically update existing documents as well as information and suggestions on uses of OS/MVS, MUSIC/SP, the VAXcluster, Microcomputers, and other resources available to NTSU students and faculty. To facilitate the dispersal of *Benchmarks*, *** FREE *** subscriptions are available. To receive yours, send the following information to us either by snail mail (the post office or campus mail) or electronically, to the UserID AS04 on MUSIC, VMS, or CMS.

Name: _____

Mailing Address: _____

PLEASE GIVE A CAMPUS ADDRESS (NOT BOX) IF POSSIBLE! -
It's Cheaper !!

☐ Renewal ☐ Change of Address ☐ Cancel Subscription

North Texas State University Computing Center

**Academic Computing Services
The Computing Center
NT Box 13495
North Texas State University
Denton, TX 76203**
